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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/527,850

06/23/2005

Christian Muehlig

3266

1887

7590  
Striker Striker & Stenby  
103 East Neck Road  
Huntington, NY 11743

03/23/2007

EXAMINER

EVANS, FANNIE L

ART UNIT

PAPER NUMBER

2877

MAIL DATE

DELIVERY MODE

03/23/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

<b>Interview Summary</b>	Application No. 10/527,850	Applicant(s) MUEHLIG ET AL.	
	Examiner F. L. Evans	Art Unit 2877	

All participants (applicant, applicant's representative, PTO personnel):

(1) F. L. Evans (primary examiner). (3) \_\_\_\_\_.

(2) William Valance (applicant's representative). (4) \_\_\_\_\_.

Date of Interview: 20 March 2007.

Type: a) ☐ Telephonic b) ☐ Video Conference  
c) ☒ Personal [copy given to: 1) ☐ applicant 2) ☒ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.  
If Yes, brief description: \_\_\_\_\_.

Claim(s) discussed: 16 and 32.

Identification of prior art discussed: None.

Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: The examiner indicated that the step of ascertaining in claims 16 and 32 would not overcome the rejection of the claims under 35 USC 101. The examiner suggested that the addition of the step of outputting whether or not the optical material is suitable for making the optical element would overcome the rejection. This addition is not new matter. The new drawing will correct the spelling of Holder (remove the space after the "H").

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

  
Examiner's signature, if required

## Summary of Record of Interview Requirements

### Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

### Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

#### Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

#### 37 CFR §1.2 Business to be transacted in writing.

All business with the Patent and Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,  
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

### Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

2414

PTOL-413A (05-03)  
Approved for use through xx/xx/xxxx. OMB 0851-0031  
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

### Applicant Initiated Interview Request Form

Application No.: 10/527,859 First Named Applicant: C. MUEHLIG, et al  
 Examiner: F. EVANS Art Unit: 2827 Status of Application: NON-FINAL

#### Tentative Participants:

(1) William Valance (2) F. EVANS  
 (3) Reg. No. 28,275 (4) \_\_\_\_\_

Rejection

Proposed Date of Interview: 3/20/2007 Proposed Time: 6:45 (PM)

#### Type of Interview Requested:

(1) ☐ Telephonic (2) ☒ Personal (3) ☐ Video Conference

Exhibit To Be Shown or Demonstrated: ☐ YES ☒ NO

If yes, provide brief description: \_\_\_\_\_

### Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) <u>Rej.</u>	<u>16-27</u>	<u>under 35 U.S.C. 101</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(2) <u>Obj. to Drawing - lack thereof</u>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(3) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Continuation Sheet Attached

Brief Description of Arguments to be Presented: Is the figure acceptable.

Arguments will show amended claim 6 & new claim 32  
claim methods that are useful, tangible & concrete

An interview was conducted on the above-identified application on March 20, 2007.

#### NOTE:

This form should be completed by applicant and submitted to the examiner in advance of the interview (see MPEP § 713.01).

This application will not be delayed from issue because of applicant's failure to submit a written record of this interview. Therefore, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible.

Michael J. Striker /

(Applicant/Applicant's Representative Signature)

(Examiner/SPB Signature)

This collection of information is required by 37 CFR 1.133. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

2414

PTOL-413A (05-03)

Approved for use through 11/10/2006. OMB 0851-0031  
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

## Applicant Initiated Interview Request Form

Application No.: 10/527,858 First Named Applicant: C. MUEHLIG, et al  
 Examiner: F. EVANS Art Unit: 2877 Status of Application: NON-FINAL  
Rejection

## Tentative Participants:

(1) William Valance (2) F. Evans  
Reg. No. 28,275 (3) \_\_\_\_\_ (4) \_\_\_\_\_

Proposed Date of Interview: 3/20/2007 Proposed Time: 1:45 (PM)

## Type of Interview Requested:

(1) ☐ Telephonic (2) ☒ Personal (3) ☐ Video Conference

Exhibit To Be Shown or Demonstrated: ☐ YES

☒ NO

If yes, provide brief description: \_\_\_\_\_

## Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) <u>Rej.</u>	<u>16-27</u>	<u>under 35 U.S.C. 101</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) <u>Obj. to Drawing - lack thereof</u>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Continuation Sheet Attached

Brief Description of Arguments to be Presented: Is the figure acceptable.

Arguments will show amended claim 1 & new claim 32  
claim methods that are useful, tangible, & concrete

An interview was conducted on the above-identified application on \_\_\_\_\_.

## NOTE:

This form should be completed by applicant and submitted to the examiner in advance of the interview (see MPEP § 713.01).

This application will not be delayed from issue because of applicant's failure to submit a written record of this interview. Therefore, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible.

Michael J. Striker /

(Applicant/Applicant's Representative Signature)

(Examiner/SPE Signature)

This collection of information is required by 37 CFR 1.133. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 27 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**Examiner: F.L. EVANS; Art Unit: 2877; Docket No.: 3266**

**In RE: U.S. National Stage Application of C. MUEHLIG, et al**

**Ser. No.: 10/527,850**

**Filing Date: June 23, 2005**

March 8, 2007

**AMENDMENT**

*(Informed  
Copy)*

Hon. Commissioner of Patents  
and Trademarks,  
Washington, D.C. 20231

Sir:

In response to the Office Action dated December 8, 2006, please make  
the following changes and consider the following REMARKS:

**In the Claims:**

Please cancel claims 17, 28, and 29 without prejudice, amend claims 16, 18, and 25, and add new claims 30 to 35 as follows:

Claims 1 to 15 (canceled).

16.(currently amended) A method of determining suitability of ~~[[an]]~~ a crystalline optical material for production of an optical element, particularly for high-energy irradiation, wherein radiation-induced absorption is detected or identified in the optical material, said method comprising the steps of:

a) pre-irradiating the crystalline optical material with laser radiation until rapid damage induced in the crystalline optical material with the laser radiation is saturated;

b) after the pre-irradiating of step a), measuring total fluorescence produced in the crystalline optical material by excitation radiation during and/or immediately after irradiating the crystalline optical material with the excitation radiation, said total fluorescence being composed of intrinsic fluorescence and non-intrinsic fluorescence; ~~and~~

c) determining the non-intrinsic fluorescence of the crystalline optical material in the total fluorescence measured during and/or immediately after irradiating with the excitation radiation~~[[.]]~~;

d) determining the intrinsic fluorescence of the crystalline optical material, said intrinsic fluorescence being a constant of said crystalline optical material;

e) determining an amount ratio of said non-intrinsic fluorescence to said intrinsic fluorescence in said total fluorescence measured in step b); and  
f) ascertaining whether or not said optical material is suitable for making said optical element according to said amount ratio determined in step e).

Claim 17.(canceled)

18.(currently amended) The method as defined in claim 16, wherein the crystalline optical material is irradiated by the excitation radiation for a short period of time.

19.(previously presented) The method as defined in claim 16, wherein the excitation radiation comprises at least one laser pulse.

20.(previously presented) The method as defined in claim 16, wherein the total fluorescence is measured with an I-CCD camera.

21.(previously presented) The method as defined in claim 16, wherein the total fluorescence is measured using a grating spectrograph.

22.(previously presented) The method as defined in claim 16, wherein the excitation radiation has an excitation radiation wavelength and during the measuring of the total fluorescence of the optical material by a measuring device



radiation emitted from the optical material at the excitation radiation wavelength is prevented from reaching the measuring device by a barrier device.

23.(previously presented) The method as defined in claim 22, wherein the barrier device is a radiation filter and/or a spectral grating.

24.(previously presented) The method as defined in claim 16, wherein the total fluorescence is measured after halting the irradiating of the optical material with the excitation radiation during a time interval in which the non-intrinsic fluorescence decays.

25.(currently amended) The method as defined in claim 16, wherein the crystalline optical material is  $\text{CaF}_2$ ,  $\text{BaF}_2$ ,  $\text{SrF}_2$ ,  $\text{LiF}$ ,  $\text{NaF}$ ,  $\text{MgF}_2$  or  $\text{KMgF}_3$ .

26.(previously presented) The method as defined in claim 16, wherein the intrinsic fluorescence comprises intrinsic fluorescence bands, the non-intrinsic fluorescence comprises non-intrinsic fluorescence bands and one of said intrinsic fluorescence bands is used to standardize the non-intrinsic fluorescence bands.

27.(previously presented) The method as defined in claim 16, wherein radiation energy densities of the excitation radiation are comparable to those of the radiation-induced absorption.

Claims 28 to 29.(canceled)

30.(new) The method as defined in claim 16, further comprising measuring the total fluorescence with a measuring device and wherein said measuring device comprises a source for propagating the excitation radiation along a predetermined light path; a holder for a material sample to be measured arranged in the predetermined light path; means for measuring fluorescence intensities of light emitted from the material sample when the material sample is held in the holder, said means for measuring fluorescence intensities being arranged off the predetermined light path, and a barrier device located between the holder and the means for measuring fluorescence intensities, said barrier device comprising means for preventing radiation from the material sample having a wavelength that is the same as that of the excitation radiation from reaching the means for measuring fluorescence intensities.

31.(new) The method as defined in claim 30, wherein said source for propagating said excitation radiation is a pulsed laser, the means for measuring fluorescence intensities is a grating spectrograph equipped with a CCD camera, and the barrier device is a dielectric thin-layer filter.

32.(new) A method of determining suitability of an alkaline or alkaline earth fluoride monocrystal for making an optical element for high-energy irradiation,

wherein radiation-induced absorption is detected or identified in the monocrystal, said method comprising the steps of:

a) pre-irradiating the alkaline or alkaline earth fluoride monocrystal with laser radiation until rapid damage induced in the alkaline or alkaline earth fluoride monocrystal with the laser radiation is saturated;

b) after the pre-irradiating of step a), measuring total fluorescence produced in the alkaline or alkaline earth fluoride monocrystal by excitation radiation at an excitation radiation wavelength below 200 nm by means of a fluorescence measuring device during and/or immediately after irradiating the alkaline or alkaline earth fluoride monocrystal with the excitation radiation, said total fluorescence being composed of intrinsic fluorescence and non-intrinsic fluorescence;

c) during the measuring of the total fluorescence, preventing ultraviolet radiation at the excitation radiation wavelength propagated toward the fluorescence measuring device from reaching the measuring device by means of a barrier device;

d) determining the non-intrinsic fluorescence of the alkaline or alkaline earth fluoride monocrystal in the total fluorescence measured during and/or immediately after irradiating with the excitation radiation;

e) determining the intrinsic fluorescence of the alkaline or alkaline earth fluoride monocrystal, said intrinsic fluorescence being a constant of said alkaline or alkaline earth fluoride monocrystal;

f) determining an amount ratio of said non-intrinsic fluorescence to said intrinsic fluorescence in said total fluorescence measured in step b); and

g) ascertaining whether or not said alkaline or alkaline earth fluoride monocrystal is suitable for making said optical element according to said amount ratio determined in step e).

33.(new) The method as defined in claim 32, wherein said barrier device is a wavelength-specific dielectric thin-layer filter.

34.(new) The method as defined in claim 16, wherein said optical element is a lens, a prism, a light-conducting rod or an optical window for DUV photolithography, for steppers, for excimer lasers, for wafers, for computer chips, for integrated circuits, and for electronic devices that contain said integrated circuits and said computer chips.

35.(new) The method as defined in claim 32, wherein said optical element is a lens, a prism, a light-conducting rod or an optical window for DUV photolithography, for steppers, for excimer lasers, for wafers, for computer chips, for integrated circuits, and for electronic devices that contain said integrated circuits and said computer chips.

**In the Specification:**

Please make the following changes at the indicated locations in the specification:

**Page 7, lines 21 to 26, please make the following changes in the paragraph between these lines:**

With the method according to the present invention, it is now possible to determine fluorescences, the wavelengths of which are close to the excitation wavelength. This is particularly significant for the use of optical elements in photolithography, since the energy of fluorescence at wavelengths of this type is also sufficient to expose the photosensitive resist of a wafer-waver, which results in a strong loss of contrast in the circuit pattern projected onto the wafer.

**Page 8, line 26, please insert the following:**

**BRIEF DESCRIPTION OF THE DRAWING**

The following sole figure is a diagrammatic representation of a preferred device for carrying out the method of determining the suitability of a crystalline optical material, especially an alkali or alkaline earth halide crystal, for making an optical element, especially an optical element for photolithograph.

**Page 8, line 27, to page 9, line 17, please make the following changes in the paragraph between these lines:**

The present invention also relates to a device for carrying out a particularly preferred method according to the present invention. A device of this type includes a radiation source, especially a pulsed laser 10, for transmitting excitation radiation at an excitation wavelength, a sample holder 30 for holding a material sample to be determined, and a device for measuring determining a fluorescence intensities of fluorescence induced in the material sample by the excitation radiation wavelength. The excitation radiation wavelength travels along a typically linear beam path that starts at the radiation source, through the material sample, and preferably enters a reference photodiode. According to the present invention, the fluorescence determination device is located outside this beam path, so that no radiation of the excitation wavelength can strike the fluorescence determination device directly. The device is preferably arranged such that the fluorescence to be measured describes a fluorescence beam path that extends perpendicularly to the excitation beam path. The fluorescence measurement device typically includes one or more optical lenses that bundle the fluorescence emitted by the material sample to be investigated in a polychromator and/or a grating spectrograph 20. The fluorescent light that is broken down into its individual wavelengths in the spectrograph is then deflected to a CCD camera 25, in particularly an I-CCD, in which the intensities at intensity ~~of the individual wavelengths are~~ are ~~[[is]]~~ determined and are preferably processed ~~is preferably processes~~ and stored using a computer 50 and/or a data processing system. The fluorescence intensities points determined and stored in this manner

using the CCD camera can [[now]] be easily compared with stored standard values and analyzed by ~~determined in~~ the computer.

**Page 9, lines 19 to 28, please make the following changes in the paragraph between these lines:**

The device according to the present invention is unique in that a barrier element is located between the material sample to be tested and the CCD camera that prevents the high-energy excitation radiation wavelength from passing through to the CCD camera. ~~The By way of the barrier element located in the device~~ according to the present invention[[.]] ~~it is ensured~~ insures that no light from the radiation source reaches the CCD camera. The barrier element also prevents scattered light from the excitation wavelength from reaching the CCD camera, which could not only falsify the measurement but also destroy this highly sensitive camera. The barrier element used according to the present invention should not fluoresce itself at the excitation wavelengths and thereby falsify measured fluorescent values.

**Page 9, line 30, to page 10, line 6, please make the following changes in the paragraph between these lines:**

All types of devices that deflect, reflect or absorb a certain wavelength are suitable for use as the barrier element. The simplest configuration is an optical grating, for example, as included in a polychomator and/or spectrographs. In a further preferred exemplary embodiment according to the present invention, the

barrier element includes a wavelength-specific filter 40, in particular a multilayer filter, in the case of which a double layer or multiple reflective layers are applied that blank out or reflect the particular wavelength. A particularly preferred filter is a dielectric thin-layer filter.



**In the Drawing:**

Please accept the accompanying new drawing sheet, which illustrates the fluorescence intensity measuring device for performing the method according to the present invention. Entry of the new drawing figure and withdrawal of the objection to the subject matter of the application due to the lack thereof is respectfully requested.

## REMARKS

### I. ALLOWABLE SUBJECT MATTER

Method claims 16 to 27 were found to be allowable if amended to overcome the rejection under 35 U.S.C. 101. These claims have been amended and it is respectfully submitted that the changes made in the claims have overcome the rejection under 35 U.S.C. 101 as explained further herein below.

Furthermore new method claims 30 to 35 have been added for preferred embodiments of the method claimed in claim 16. These claims should also be allowed because they depend on allowable amended claim 16 or include all its features and limitations.

### II. CLAIM CHANGES

The claimed method is a method of testing an optical material to determine whether or not it is suitable for making an optical element, especially for DUV lithography, or alternatively a method of controlling the quality of the optical element. If the optical material has an acceptable ratio of non-intrinsic fluorescence to intrinsic fluorescence, then the optical material may be used to make the optical element. If the ratio does not have an acceptable value, then the optical material cannot be used to make the optical element.

The testing method claims in claims 16 to 27 and 30 to 35 thus saves the

work of making the optical element from the optical material in cases in which the optical element would not have acceptable properties for e.g. DUV photolithography because it was made with an inferior or unacceptable optical material.

Claim 16 has been amended by limiting the optical material tested to crystalline optical material in accordance with page 8, lines 20 to 21, of the applicants' originally filed specification. Dependent claims 18 and 25 have been amended in a similar manner.

Claim 16 has also been amended by adding three new steps to provide a concrete "real world" result. These three new steps have basis in the originally filed claim 2 and in the disclosure in applicants' specification on page 4, lines 9 to 18, where it states that the ratio of non-intrinsic to intrinsic fluorescence can be used to quickly ascertain whether the optical material is suitable for further processing to make an optical element.

New dependent method claim 30 limits the claimed method of claim 16 to using the measuring device of canceled device claim 28 to measure fluorescence intensities. The basis for the subject matter of claim 30 is the same as the basis for canceled claim 28, which is generally the subject matter disclosed on pages 8 and 9 of applicants' specification, especially page 8, line 26, and following.

Claim 31 limits the source of the excitation radiation to a pulsed laser (basis is found on page 6, line 16, of applicants' specification), limits the fluorescence measuring device to a spectrograph with a CCD camera (basis is found on page 9, lines 8 to 14, of the applicants' specification), and limits the

barrier device to a dielectric thin-layer filter (basis is found on page 10, line 6, of applicants' specification).

The embodiment of claim 31 has the special advantage described on page 10, lines 8 to 13, that fluorescence intensities of fluorescence at wavelengths that are close to the wavelengths of the excitation radiation can be measured. It is particularly disadvantageous if an optical element fluoresces at these wavelengths during excitation in DUV photolithograph because the circuit pattern produced is noticeably blurred.

The embodiment of independent method claim 32 limits the optical material tested to alkaline or alkaline earth fluoride monocrystals (the basis for this limitation is found on page 8, line 22, of the applicants' specification). The limitation for the excitation wavelengths to below 200 nm is found on page 6, line 12, of the applicants' specification.

New dependent claims 34 and 35 are dependent method claims that depend on claims 16 and 32 and include subject matter from canceled claim 29.

### III. NEW DRAWING FIGURE

The subject matter of the application was found to admit to illustration because of the device claimed in claim 28. Claim 28 has been canceled, but the features of the device claimed in claim 28 have been included in a new dependent method claim 30. For that reason a diagrammatic illustration of the device used to perform the method according to dependent claim 30 has been added on a single new sheet of drawing.

Entry of the new drawing figure and withdrawal of the objection to the subject matter of the application due to a lack of a drawing figure is respectfully requested. No new matter has been added. Basis for the illustration is provided by the disclosure on pages 8 and 9 of the applicants' specification.

#### **IV. SPECIFICATION CHANGES**

Some minor spelling and wording errors were corrected in various paragraphs to provide a grammatically correct description on pages 7 to 9 of the applicants' specification. No new matter was entered.

A "Brief Description of the Drawing" section was added to page 8 of the specification, as required by the rules. Drawing reference characters were included in the description of the device following the "Brief Description of the Drawing" section.

#### **V. REJECTION FOR CLAIMING NON-STATUTORY SUBJECT MATTER**

Claims 16 to 27 were rejected for claiming non-statutory subject matter.

Method claim 16 has been amended, as described above, so that it now claims statutory subject matter.

Amended method claim 16 claims a method, which is a practical

application of fluorescence intensity measurements of fluorescence bands of an optical material. As such amended method claim 16 complies with the requirements for statutory subject matter in M.P.E.P. 2106 IV. C. 2.

The last step of the amended method claim 16 reads as follows:

**"ascertaining whether or not said optical material is suitable for making said optical element according to said amount ratio determined in step e)".**

It is respectfully submitted that the last step f) of the amended method claim 16 recites the "useful, concrete, and tangible result" that the claimed method produces.

The claimed method of amended claim 16 is **useful** because it discloses a method of testing a crystalline optical material to determine if it is suitable as a starting material to make an optical element of a required quality. If for example the amount ratio of non-intrinsic fluorescence intensities to intrinsic fluorescence intensities in the total fluorescence spectra were less than a certain predetermined limiting value depending on the particular application of the optical element, then the tested crystalline optical material would be suitable for making the optical element. It is comparatively simple to rapidly measure the amount ratio of fluorescence intensities for a non-intrinsic fluorescence band and an intrinsic fluorescence band with the device described on pages 8 and 9 of applicants' specification. An amount ratio that is too large would signal too many contaminants in the optical material and/or too many crystal inclusions or lattice imperfections, as explained in the background section of the applicants' specification on page 1 of the applicants' specification. If the claimed method shows that the optical material is unsatisfactory for making the optical element,

then other materials can be tested until a suitable material is found for the optical element for the given application. In that way the work involved in making many optical components with different materials and then testing the optical components to determine if they have the appropriate properties for the particular application of that optical component is avoided. This would save money and time so that the result of step f) of claim 16 is useful.

The utility asserted is credible, specific, and substantial. It is **credible** because one skilled in the art knows that many optical components, such as lenses and prisms, are made with crystalline materials. Furthermore one skilled in the art knows that such materials must be comparatively pure and must lack imperfections, for example due to laser pulse damage, which can impair the performance of the optical components. Thus one skilled in the art knows that method of testing samples of crystalline optical materials to determine if they have amounts of impurities and/or too many dislocations and imperfections would be extremely valuable for use in a plant or operation that makes optical components, such as lenses and prisms, from crystalline optical materials.

The result is sufficiently **specific and substantial** because almost any crystalline optical material can be used to make an optical component. Furthermore dependent method claim 25 limits the tested optical materials to various metal fluoride crystals.

Independent method claim 32 is directed to the method of testing the **specific** materials for the optical element used in DUV photolithography. Claim 32 limits the tested crystalline optical materials to alkali halide and alkaline earth

fluoride monocrystals. Method claim 32 also limits the method to excitation radiation in the deep UV and a barrier device for blocking excitation radiation. Dependent claim 33 limits the method of claim 32 to a wavelength-specific filter as barrier device. The features of method claims 32 and 33 are characteristic of DUV photolithography applications, in which it is so very important to avoid fluorescence radiation at wavelengths that are close to those of the deep UV excitation radiation used in DUV photolithography.

The result in the last steps of claims 16 and 32 is **tangible** because it sets forth a practical application of fluorescence measurements (natural phenomenon) that produces a real-world result (knowledge of whether or not a specific crystalline optical material or sample of this optical material can be used to make an optical element or component for a particular application, such as DUV lithography).

The result in the last steps of claims 16 and 32 is **concrete** because it would be repeatable and predictable for the specific materials used for the particular application involved.

See M.P.E.P. 2106 IV. C. 2. (B) (2) section a) to c) and M.P.E.P. 2107.

For the foregoing reasons and because of the changes in the claims withdrawal of the rejection of amended claims 16 to 27 under 35 U.S.C. 101 for claiming non-statutory subject matter is respectfully requested.

Furthermore it is respectfully submitted that none of the new claims 30 to 35 should be rejected under 35 U.S.C. 101.



## VI. OTHER REJECTIONS

Optical element claim 29 was rejected under 35 U.S.C. 102 (b) as clearly anticipated by Borelli, et al (WO 98/08775).

Optical element claim 29 has been canceled without replacement. No optical element claims are pending, thus obviating the rejection of the optical element claim 29 as anticipated by Borelli, et al.

Device claim 28 was rejected under 35 U.S.C. 102 (b) as clearly anticipated by Mullaney, et al (US 3,824,402)

Device claim 28 for a device for measuring fluorescence has been canceled without replacement, thus obviating its rejection as anticipated by Mullaney, et al.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549-4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,

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